

Application No. 10/797,425
Response dated January 6, 2006
to Office Action mailed October 18, 2005

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0004] with the following amended paragraph:

[0004] The present invention provides a SiGe thin layer semiconductor structure that reduces or solves the above described and/or other problems with prior art semiconductor devices. The present invention further provides a thin layer SiGe semiconductor structure that reduces the poly depletion effect without compromising salicide integrity. To this end, a SiGe thin layer semiconductor structure is provided containing a substrate having a dielectric layer, a variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer on the dielectric layer, and a Si cap layer on the variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer. The variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer can contain a $\text{Si}_x\text{Ge}_{1-x}$ layer with a graded Ge content or a plurality of $\text{Si}_x\text{Ge}_{1-x}$ ~~sub-layers~~ sublayers each with different Ge content.

Please replace paragraph [0031] with the following amended paragraph:

[0031] At 304, a variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer 440 is formed on the dielectric layer 410. In the embodiment shown in FIG. 4, the variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer 440 contains a first $\text{Si}_x\text{Ge}_{1-x}$ sublayer 420, with a Ge content 421 of about 0.2, formed on the dielectric layer 410, and a second $\text{Si}_x\text{Ge}_{1-x}$ sublayer 430, with a Ge content 431 of about 0.1, formed on the first $\text{Si}_x\text{Ge}_{1-x}$ sublayer 420. Alternately, the Ge content 421 can be less than 0.2 and the Ge content 431 can be less than 0.1. In another embodiment of the invention, the first $\text{Si}_x\text{Ge}_{1-x}$ sublayer 420, can have a Ge content of between about 0.3 and about 0.5, and the second $\text{Si}_x\text{Ge}_{1-x}$ sublayer ~~440~~430, can have a Ge content between about 0.05 and about 0.15. As will be appreciated by one skilled in the art, the invention is not limited to the above-mentioned $\text{Si}_x\text{Ge}_{1-x}$ sublayer compositions, as a large range of $\text{Si}_x\text{Ge}_{1-x}$ sublayer compositions can be used. Furthermore, the invention is not limited by a variable composition $\text{Si}_x\text{Ge}_{1-x}$ layer 440 containing two $\text{Si}_x\text{Ge}_{1-x}$ sublayers 430 and 420, as any number of sublayers may be used. It may be appreciated that one or more first $\text{Si}_x\text{Ge}_{1-x}$ sublayers 420 adjacent the dielectric layer 410 have a higher Ge content,

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for example about 0.2 to about 0.5, to achieve a reduction in the poly-depletion effects, while one or more second $\text{Si}_x\text{Ge}_{1-x}$ sublayers 430 have a lower Ge content, for example about 0.1 or less, to ensure salicide integrity. In one embodiment of the invention, the first $\text{Si}_x\text{Ge}_{1-x}$ sublayer 420 and the second $\text{Si}_x\text{Ge}_{1-x}$ sublayer 430 can be between about 300Å and about 500Å thick each. The $\text{Si}_x\text{Ge}_{1-x}$ sublayers 430 and 420 can be formed by a chemical vapor deposition (CVD) process using a Si-containing gas, for example silane (SiH_4), disilane (Si_2H_6), dichlorosilane (SiH_2Cl_2), or hexachlorodisilane (Si_2Cl_6), and a Ge-containing gas that can, for example, be selected from GeH_4 and GeCl_4 .